mallets, sticks, etc.). In other examples, particular menus, text entry areas or other input areas can be generated in the VR space to provide virtual keypads, number pads, or other selectable virtual objects capable of providing user-selectable letters, numbers, or symbols for entering text into applications in the VR space.

FIG. **1** illustrates a user accessing a virtual reality (VR) space to perform interactive tasks. The example implementation shown in FIG. **1** will be described with respect to a user **102** wearing an HMD device **104** that substantially blocks out the ambient environment, so that the HMD device **104** generates a virtual environment/VR space, with the user's field of view confined to the VR space generated by the HMD device **104**. However, the concepts and features described below with respect to FIG. **1** may also be applied to other types of HMD devices, and other types of virtual reality environments and augmented reality environments. In addition, the examples shown in FIG. **1** include a user illustrated as a third-person view of the user **102** wearing the HMD device **104** and holding the controllers/mallets/drumsticks **106** and **108**. The view **100** illustrates a first person view of what may be viewed by the user **102** in the VR space generated by the HMD device **104** and the systems described herein. Such views are more explicitly illustrated in FIGS. **3**A-**3**C.

In the example shown in FIG. **1**, the user **102** wearing the HMD device **104** is facing into a room defining a VR space in view **100**. The HMD device **104** may capture images and/or collect information defining features in the VR space. The images and information collected by the HMD device **104** (or by one or more tracked hands, drumsticks, or controllers (e.g., drumsticks **106** and/or **108**) may then be processed by the HMD device **104** to render and display a 3D model of the VR space and any number of models of virtual objects. In general, drumsticks **106** and **108** may be controlled by controllers, hands, arms, eye movements, or other trackable input.

In the depicted example, the view **100** includes a keyboard **110** that the user has manipulated to be more ergonomic for text entry and user comfort and a screen **112** that has also been modified according to user preferences. The keyboard **110** includes a modified spacebar **115** and a number of letters, symbols, and number keys that have been adjusted to receive drumstick or mallet-like input. The user **102** is shown swinging devices **106** and **108** in respective paths/trajectories **114** and **116** and in response, keys are selected in the VR space, which can be translated to generate output text **118** (i.e., "THIS NOVEL WILL BE MY MASTERPIECE . . . "). The devices **106** and **108** each have a definable tip (e.g., **120**, **122**) that may be used to collide with the keyboard **110**. In some implementations, trajectories of the tip may be detected. In some implementations, the trajectories of the tip of a virtual object, for example, may be detected and/or determined using mathematical prediction models to verify the detected locations of the moving tip. In some implementations, the mathematical prediction model may include determining a probability of the impact of the tip on a particular key on the keyboard. The probability can be calculated as a level (e.g., a percentage) and can be provided as an indicator as to which key (e.g., location) may be impacted by the tip. In some implementations, the probability may pertain to a time at which the tip will impact a particular key.

Referring now to FIG. **2**, a block diagram is depicted of an example system **200** for providing various modes in which to input textual content in applications in a VR space. The system **200** may provide a 3D VR space and 3D (volumetric) objects and VR content using the methods, components, and techniques described herein. In particular, system **200** can provide a user with a number of options in which to interact with controllers to manipulate virtual objects and text entry within the VR space. In some implementations, the system **200** can enable the user to enter textual data using hand gestures tracked by system **200**, rather than controllers.

The example system **200** includes a plurality of computing devices that can exchange data over a network **201**. The devices may represent clients or servers and can communicate via network **201**, or another network. In some implementations, the client devices may include one or more gaming devices or controllers, a mobile device, an electronic tablet, a laptop, a camera, VR glasses, or other such electronic device that may be used to access VR content.

As shown in FIG. **2**, the system **200** includes a mobile device **202**, a laptop computing device **204**, a VR headset and/or a head mounted display (HMD) device **206**, and VR system **208**. Devices **202**, **204**, and **206** may represent client devices. Mobile device **202**, computing device **204**, and HMD device **206** can include one or more processors and one or more memory devices. The devices **202**-**206** can execute a client operating system and one or more client applications that can access, control, and/or display VR content on a display device included in each respective device, or in a connected device.

The VR system **208** may represent a server device. In general, VR system **208** may include any number of repositories storing content and/or virtual reality software modules that can generate, modify, or execute virtual reality scenes. In the depicted example, VR system **208** includes a VR application **210** that can access and present content and/or controls for system **208**. In some implementations, VR application **210** can run locally on one or more of devices **202**-**206**. The VR application **210** can be configured to execute on any or all of devices **202**, **204**, **206**, and **208** and be controlled or operated upon using virtual controllers **212** or **214**, for example.

Particular implementations described in this disclosure may enable a user to use one or more controllers to interact with the VR space for purposes of entering text into applications or with respect to virtual objects in the VR space. For example, the user can hold a first controller **212** and a second controller **214** to select and manipulate virtual objects in 3D in the VR space and to enter text into keyboards or other objects fashioned in the VR space. In some implementations, controllers **212** and **214** may be the same make and model. In other implementations, controllers **212** and **214** may be of a different make and model. Regardless of the type of controller, both controllers **212** and **214** can be viewed and/or tracked in system **200** in order to facilitate interaction in the VR space.

Example controllers **212** and **214** may each include a housing in which internal components of the controller device are received, and a user interface (not shown) on an outside of the housing, accessible to the user. The user interface may include a plurality of different types of manipulation devices (not shown in detail in FIG. **2**) including, for example, touch sensitive surface(s) configured to receive user touch inputs, buttons, knobs, joysticks, toggles, slides and other such manipulation devices.

One or more sensors can be included on controllers **212** and/or controller **214**. The sensors can be triggered to provide input to the VR space, for example, by users accessing controllers **212** and/or **214** and HMD device **206**. The sensors can include, but are not limited to, a touchscreen